Explore Your Grasslands

Developed by

Bharati Vidyapeeth Institute of Environment Education and Research
Bharati Vidyapeeth, Deemed University, Pune 43

Funded by
World Wide Fund for Nature-India, New Delhi

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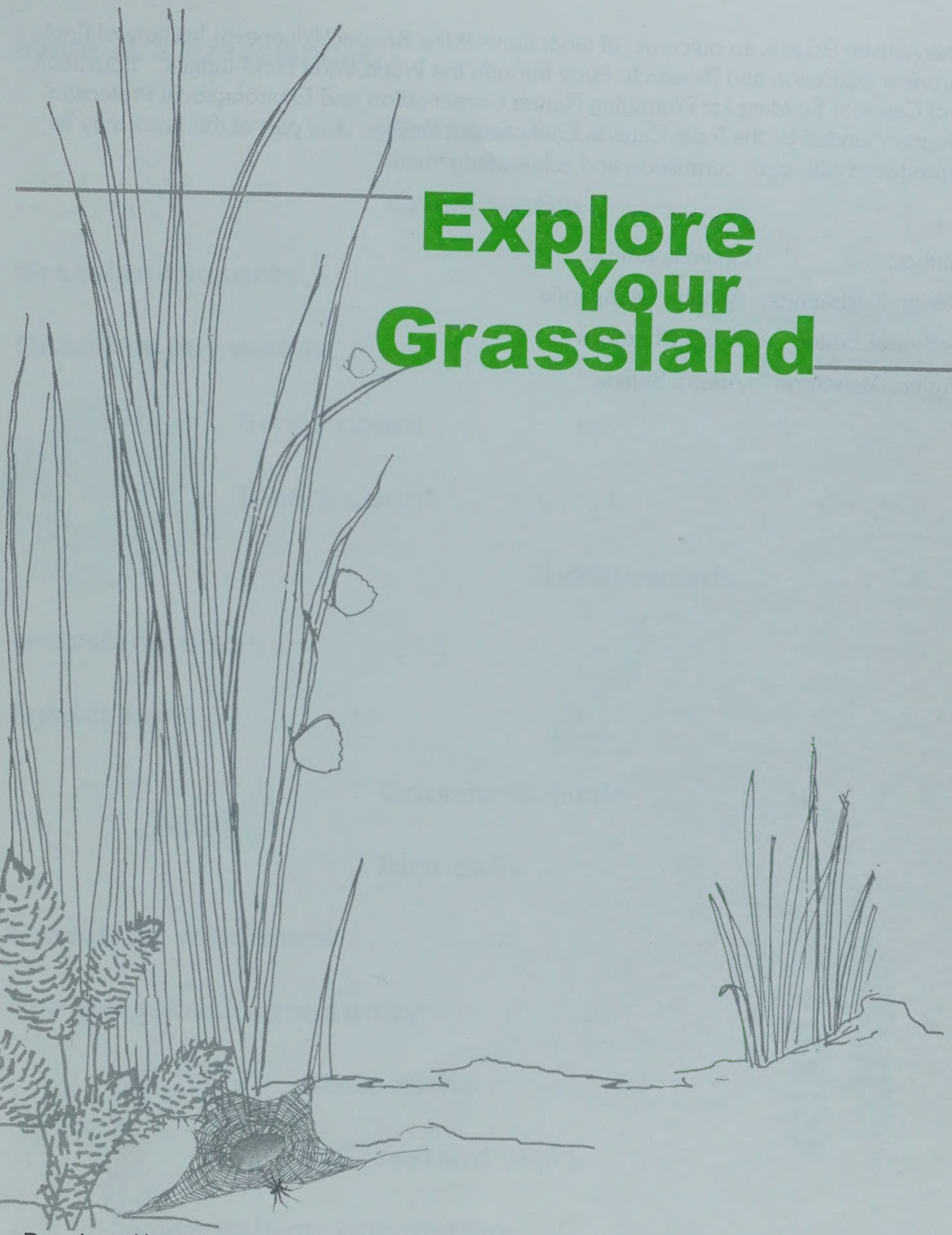

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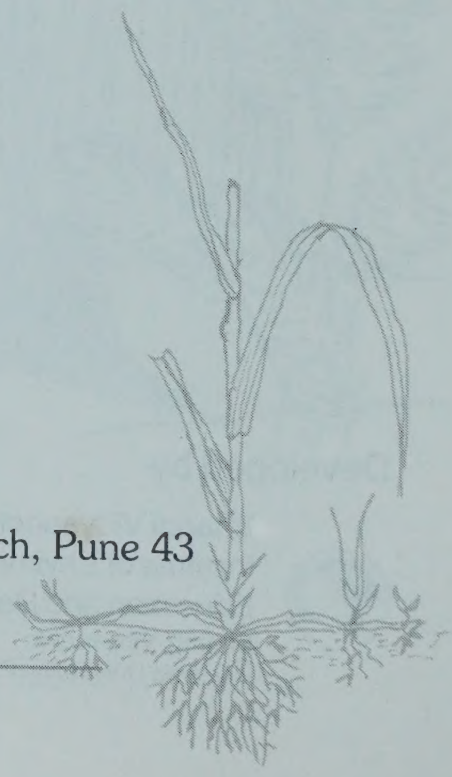

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Grassland watch.....

This book will tell you how much fun you can have exploring a grasslands' wonderful creatures and the way they live. Nature is all around us. How often have we stopped to watch and admire new leaves growing, a butterfly flitting from flower to flower or have listened to the chirping of the birds? You might have seen birds on trees in your garden or near your homes. They are different from the ones you see swimming in the water. This is because each of the birds and animals are adapted to live in a specific ecosystem.

India has a variety of different ecosystems. Natural ecosystems are forests, grasslands, deserts, rivers, lakes and seas around us. These ecosystems have their own different types of plants and animals and are dependent on factors such as geographical locations, climate, the amount of rainfall and the type of soil.

India is rated among the top fifteen nations of the world for its great diversity in plant and animal life. It is rich in flowering plants, insects, amphibians, reptiles, birds and mammal species. Many of these species are endemic to India, that is they are not found anywhere else in the world.

This Activity Book contains information about India's grasslands and the plants and animals found in this ecosystem. It also has activities that will help you in exploring these grasslands and make your visit to a grassland an enjoyable learning experience.

The basic skills needed for exploring Nature are very simple-enthusiasm, patience and adequate time.

There are a few essentials that one must carry as well as certain ground rules that one must follow to make your trip fun as well as a learning experience.

Wearing dull coloured clothes helps you to blend with the surroundings so that you are able to spot animals and birds without disturbing them.

Birdwatching needs binoculars. With a binocular one can appreciate the colours, shapes and other minute details of birds.

A 'field guide' – identification book for birdsor plants or insects is also very helpful as the accuracy of your identification can be verified.

A good hand lens is a must for insect watchers as it helps you see features that cannot be seen with the naked eye.

You could also carry a transparent box with you for closer observation of insects.

No matter which aspects of Nature you are watching, noting and sketching what you see is very important. Also remember to note where and when you saw something.

Keep alert and take time to stop, look and listen to various things around you. Making loud or sudden noises or moving carelessly will disturb wildlife and reduce your chances of spotting them.

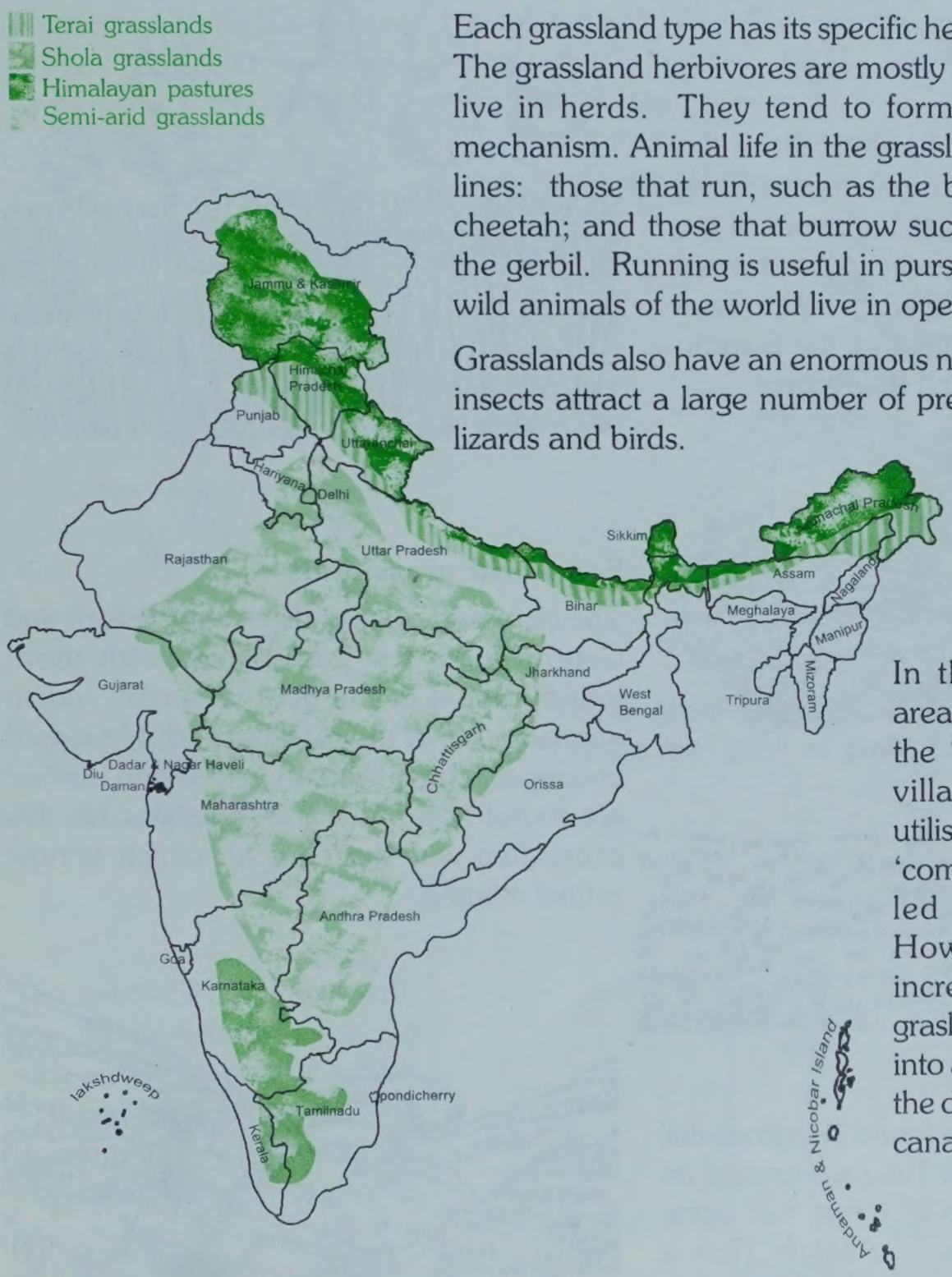
Don't forget to check the plants, especially beneath the leaves, under decaying logs or rocks for insects. Be sure to put it back the way it was.

Some species of snakes can be dangerous. Quietly move away from snakes. Most snakes are however non-poisonous.

These simple tips will help you explore your grasslands and understand this resource that provides man with so many goods and services. Conservation needs all of us. You can begin by understanding Nature.

What is a grassland ?

A grassland is an area where the annual rainfall is insufficient to support a luxuriant growth of trees, but is still high enough so that deserts are not formed. Grasslands are however not restricted to low rainfall areas. Several grassland types form either clearings in different forest types or are located on hill slopes with patches of forests along nala courses and depressions as in the shola region of South India. Grassland ecosystems form Himalayan pastures, the terai grasslands of the foothills, semi-arid grasslands of Western and Central India, in scrublands of the Deccan Plateau and in the Shola forests of the Western Ghats, Nilgiri and the Annamalai ranges. Thus depending on the quantity of rain, there are tall, medium and short grasses. Natural grasslands have a variety of grasses, forbs (small plants) and herbs. These differ according to the different grassland types.

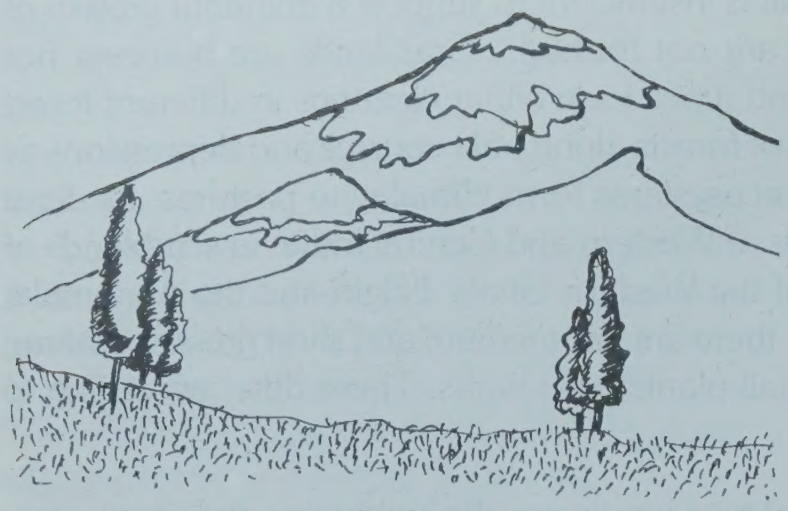


Each grassland type has its specific herbivores and carnivores. The grassland herbivores are mostly fleet footed animals that live in herds. They tend to form herds as a protective mechanism. Animal life in the grasslands evolved along two lines: those that run, such as the blackbuck, wolf and the cheetah; and those that burrow such as the hedgehog and the gerbil. Running is useful in pursuit or flight. The fastest wild animals of the world live in open grasslands.

Grasslands also have an enormous number of insects. These insects attract a large number of predatory animals like the lizards and birds.

In the past grass covered areas were considered to be the 'common property' of a village community. Over-utilisation and misuse of these 'common' grazing lands has led to their degradation. However due to our ever increasing population these graslands are being converted into agricultural lands through the development of dams and canals.

The Asiatic Cheetah that once roamed the Indian subcontinent is now extinct. Asian lions are now restricted to a single Sanctuary in Gujrat. Ecologists estimate that more than 43% of the Indian subcontinent is in the process of changing from grassland to desert.

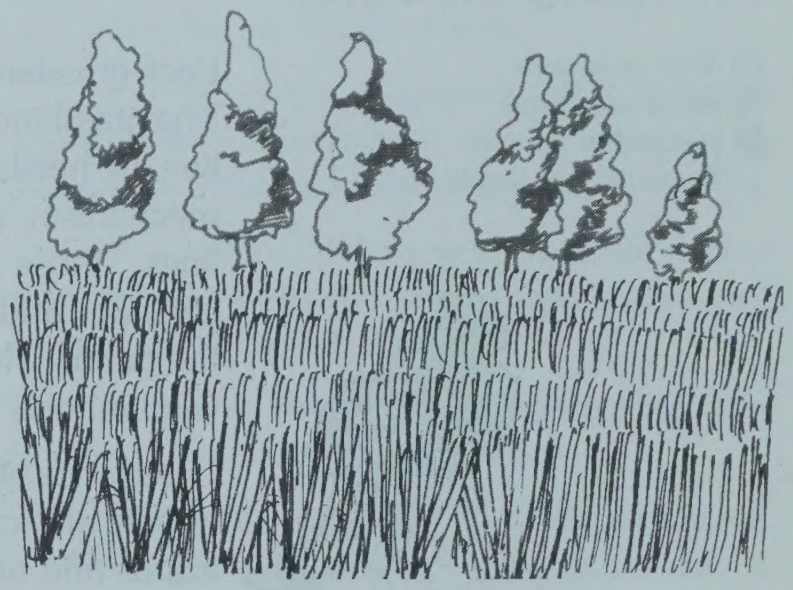


Terai grasslands

The Terai grasslands at the foothills of the Himalayas consist of tall elephant grass along with Sal forest. The largest herbivore of the Terai is the elephant. It requires an enormous amount of tall grass to feed on. The Terai grasslands form the habitat of the Swamp deer, Wild buffalo and the Rhinoceros.

Himalayan pastures

We have the Himalayan pastures in the Himalayas, which extends upto the snowline. These grasslands at the lower level are found along with coniferous or broadleaved forests. The Himalayan wildlife require both the forest and the grassland ecosystems. Several wild sheep and goat such as the Goral are found here.



Shola grasslands

The Shola grasslands are found in high rainfall areas in Southern India. They are located on hill slopes with patches of forest that occur along the nala courses. The Nilgiri Thar is found only in these grasslands. It is now highly endangered.

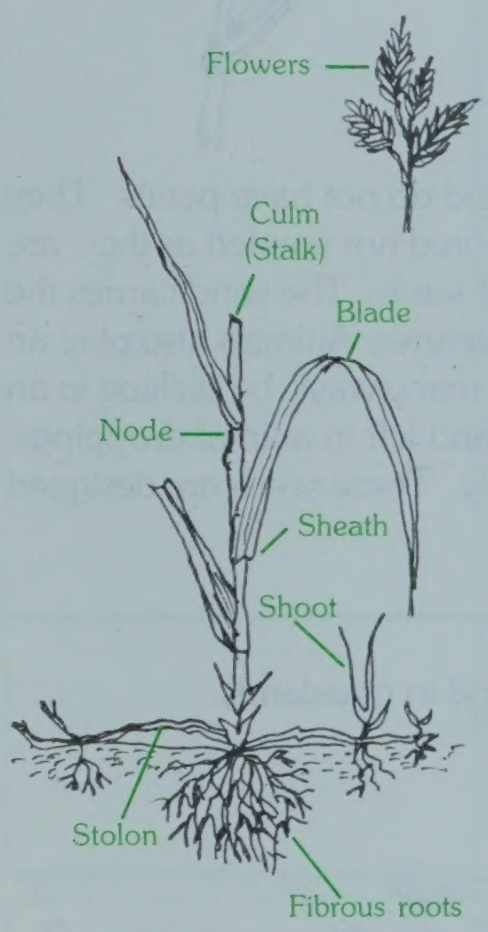
Semi-arid grasslands

The semi-arid grasslands of the Western and Central India are interspersed with thorn forests. Some of the very important Indian animals such as the blackbuck, chinkara and endangered birds like the Great Indian Bustard are found here. The apex predator of this ecosystem was the cheetah which is now extinct in India.

Grasses

Grasses are very often considered as small plants that are insignificant and do not have much value. However in reality they are a very important plant species that have over 10000 different types. They are found everywhere in deserts, in snow covered areas, in mountainous regions, on the coasts and even in water. Most significantly the grains of grasses form the staple food of people all over the world.

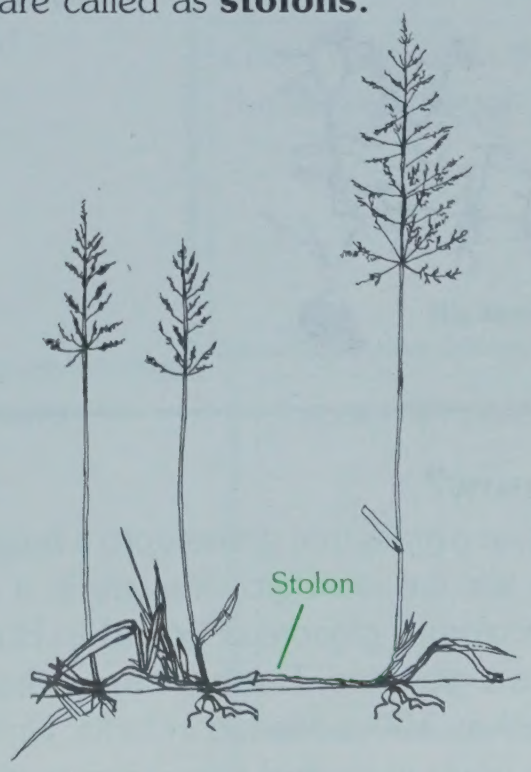
Grasses belong to a group of plants that have more than 10,000 species. Like other plants grasses also have stems, roots, leaves, flowers and fruits.



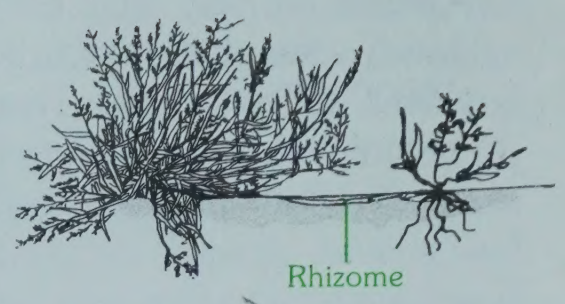
The **roots** of the grass plants are fibrous and form a strong web under the ground, which makes it difficult to pull the grass out. They thus hold the soil tightly and do not allow it to get blown away by the wind or washed away by water. Grasses thus play an important role in conservation of soil and moisture.

The **stems** of the grass plants are called as culms. They are generally cylindrical, hollow and jointed. Sometimes as in sugarcane, these culms may be filled with a soft tissue. The elongated hollow sections are interspersed with compact solid sections called nodes. Unlike other plants, grass stems grow from the nodes, not from the tops or the ends of the branches. This helps grasses to grow rapidly even when they are grazed on by a variety of animals.

Some stems grow vertically. Others may trail along the ground.These are called as **stolons.**



Grasses also have **rhizomes** or underground stems which are an intricate part of their structure. Rhizomes are brown in colour and also have nodes and internodes. Rhizomes are important as they help grasses to hold on to the soil. They also play a major role in propagation as they send up a large number of new shoots. They also play a very important role in the survival of grasses when they are burnt, as they remain unharmed when the surface vegetation is burnt and quickly send up replacements.

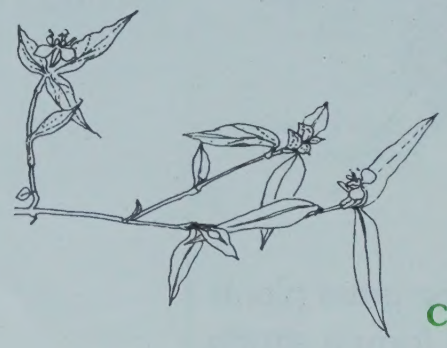


The **leaves** of grasses are ribbon like with parallel veins. The leaves encircle the stem above each node in a sheath and then protrude out in different directions.

Grasses are flowering plants. The **flowers** are extremely small and do not have petals. They normally occur in groups. These flowers are neither brightly coloured nor scented as they are mostly pollinated by wind. They produce a very large number of seeds. The wind carries the seeds to new locations. These seeds often have fine hair like structures. Animals also play an important role in the dispersal of grass seeds. This can happen in many ways: by sticking to an animal's body as when the seed is pointed and by being eaten and left in animal droppings. Some grasses have seeds that are attached to the plant very lightly. These seeds are designed to be knocked to the ground by rain or passing animals.

Several beautiful herbs with small colourful flowers are also found in grasslands.

Commelina forskalli



Commelina kurzii

Did you know?

Can you imagine a grass that grows upto a height of 30 to 50 metres? If you sit next to this plant you can even see the stem growing within a couple of hours ! This is a species of bamboo called *Dendrocalamus giganteus* found in Burma that grows at the rate of one metre a day. Yes, bamboo is a grass too. There are more than 1000 different kinds of bamboos in the world, of which more than 100 are found in India. Unlike other grasses, bamboo flowering occurs after 20 to 60 years while in several others it may not occur until 120 years after the last flowering.

Grass watch

How do you recognize a grass? If the stem has a swollen node with each leaf starting its growth at a node, sheathing the stem before splitting to form a blade, then it most certainly belongs to the grass family. Take some time to look closely at grasses and enjoy them. Whoever among you spots any grass from the chart first gets two points. After you have spotted it, with the help of your teacher share it with your classmates, learn more about it and sketch it in the space given. Remember the key to winning the game is observation!

Activity

Grass that is taller than your hips

The longest grass leaf that you can find

Grass that is shorter than your knees

Grass that is shorter than your feet

The shortest grass leaf that you can find

Grass with seeds that fall off at the slightest touch

The widest grass leaf that you can find

Grass leaf with hairy texture

Grass with pointed seeds

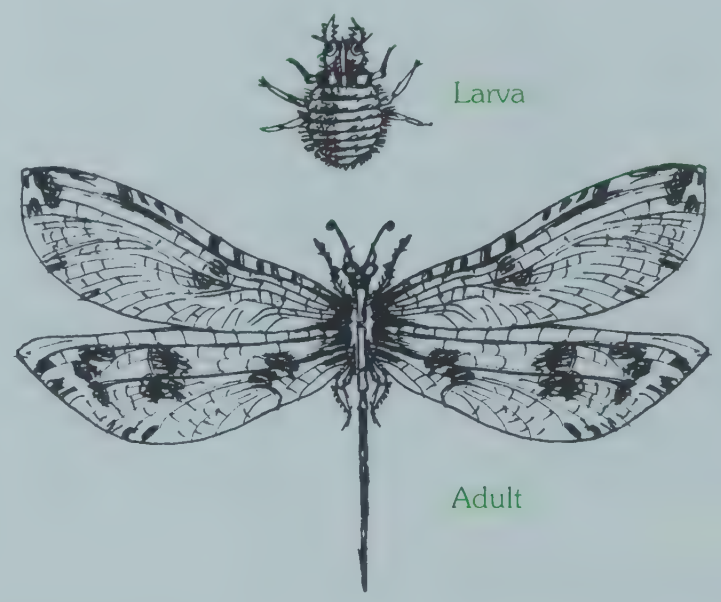
Grassland insects

As you walk around in a grassland you may not 'see' anything. Stand and watch quietly. When the animals feel safe you will see movement. As your eyes become 'tuned in' to the shapes and shadows you will be amazed at how much you can see. Grasslands are excellent places for 'insect watching'.

While many of the insects can be seen during the day, some of them come out at night. Most of the time, daytime insects can be seen an hour or so after sunrise, when they are generally 'basking' (warming up). Cool mornings are therefore best for observing insects. In summer insect activity is comparatively less. The best time of the year to watch insects is during and after the rains till November. Insect watching can also be done in March-April when trees and shrubs begin to flower and get new leaves.

Antlion

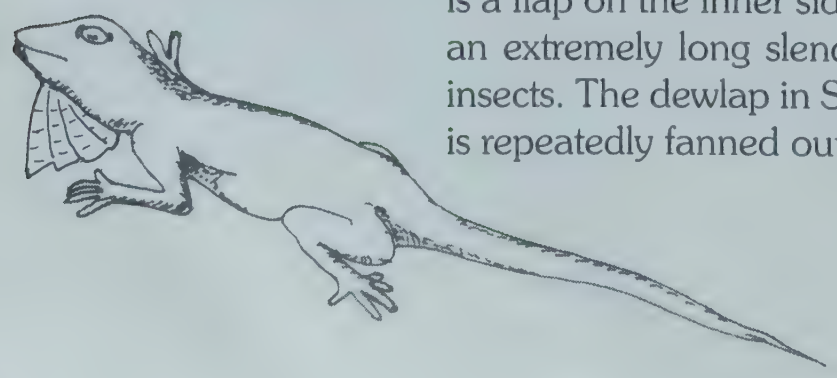
Larvae of antlions make pit traps in fine sand and soil where the larva hides in the center of the conical pit waiting for an ant or small insect to fall in. Sometimes in grasslands pits of fine soil are seen in the ground. These funnel shaped holes are traps laid by the larvae of the antlion.



The larva makes a trap by going round in circles, moving backwards. Its body thus makes a furrow in the soil. With its broad head the larva throws out soil making a round pit with sloping sides. It buries itself at the bottom and lies motionless.

When an insect walks over the edge of the pit, it falls into it, due to the sloping edges. The larva then throws more soil at the insect, seizes it with its curved mandibles and sucks the body fluid. The larva mainly feed on ants. The pits are adapted to catching ants and hence the name. When disturbed the antlion plays dead and resembles a sand particle. Adult antlions can easily be mistaken for dragonflies, but for their clubbed antennae which dragonflies do not have. The adult antlion feeds on large insects.

Lizards



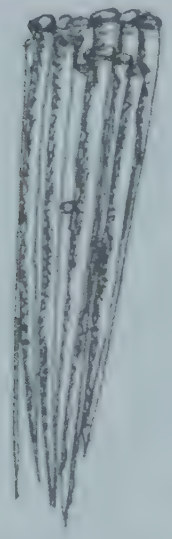
The lizards found in grasslands are characterized by the presence of crests on the neck and the back, a dewlap (this is a flap on the inner side of the neck) in the male and an extremely long slender tail. These lizards mainly feed on insects. The dewlap in Sita's lizard is bright blue in colour, and is repeatedly fanned out when the animal is excited.

Stick Insect

The stick insect is stick like and slow moving, turns green in the monsoon and later brown to match with the dry grass. They are very difficult to spot because of their resemblance to sticks. When alarmed, stick insects pretend to be dead and a foul smelling liquid oozes from the body.

Mantids

These are green or brown in colour similar to the type of shrub, herb or tree trunk they live on. They usually lie in wait for their prey lashing out with their forelegs which are armed with spines to capture and hold the smaller insects while feeding on them. The praying mantis hides in the grass waiting for its prey with its forelegs folded in a praying position. This is how it gets its name.



Bagworms

In grasslands one can normally see bagworms hanging from the branches of small trees. The bagworm is a moth and it has a unique way of protecting itself from its predators. The caterpillar of one of the species makes a 'bag' by cutting the thorns of the Babul tree and sticks them together in the shape of an inverted cone. It pops out its head only for feeding on the leaves. In the event of any danger it quickly goes into its 'bag'. It even moves around on the tree with its bag. The males have wings and become moths while the females stay inside the bag and die after laying the eggs.

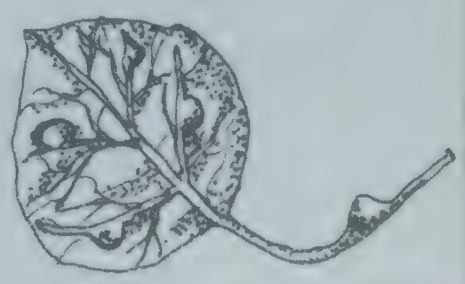
Have you found any bagworms yet ? On which trees did you find them?

Activity

Gall watch

A gall is an abnormal growth of plant tissue produced when some substance is injected into any part of the plant. (leaf, stem, root, etc.) This substance causes that part of the plant to swell or grow in a particular pattern. The shape of the galls may be round, kidney like, disc shaped or spindle shaped. The gall with its solid outer walls and constant food supply forms a perfect home for insects. Each gall making insect produces a specific kind of gall and it usually grows on just one species of plant.

Search your grassland for galls.
Look on leaves and stems. Cut the gall in half. Is there an insect in it? Is it in its larval stage? You can keep galls in a jar. Cover them with a damp cloth. Check everyday to see when and what kind of insect appears from the gall.



Spittle Insect

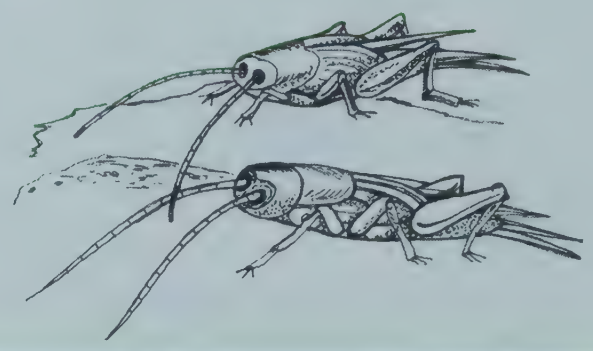
The spittle insect is a dull coloured insect which is usually not more than 13 mm in length. The nymph surrounds itself with a spittle like secretion and this can be seen as a blob of spit on a blade of grass or around a twig. The adults do not make such formations and are normally seen hopping around.

What happens to the spittle formation when it rains? Can it withstand the rain or is it destroyed ? How many days does it take for the nymph to become an adult ? Keep a watch.

Crickets

Crickets are also seen in grasslands. They are known for their loud shrill chirping which is produced when they rub their wings against each other. They are generally burrowing insects and eat both plant and animal material. Crickets are generally dull coloured and are active at night.

Can you observe and tell the difference between a grasshopper and a cricket ? In which season do you hear crickets sing the most ?



Grasshoppers

One of the most commonly seen grassland insects are grasshoppers. They are mostly found hopping among grasses and have tremendous leaping power, hence the name. Grasshoppers are found all over the world except in cold regions. The grasshoppers like other insects do not have a true voice. They however indulge in 'singing' by rubbing their powerful hind legs to the leathery forewings. This is mostly a signal by a male to a female grasshopper.Grasshoppers have strong hind legs that help them to jump. They feed on grass and other vegetation. They are very well camouflaged with their surroundings and are found in large numbers during the rainy season.

Grasshoppers are of two main kinds- short horned and long horned grasshoppers. Long horned grasshoppers are active only at night while short horned grasshoppers are active during the day and night. Grasshoppers protect themselves from their predators in various ways. They have excellent camouflage and look like leaves, twigs or tree barks in their surroundings. Some of them like the painted grasshopper have bright yellow and blue colours that warn the predators of its bad taste. Some of them have special body structures like the hooded grasshopper. It has a flat hood over the back which makes it look like a leaf thus fooling its predators.

Painted grasshopper

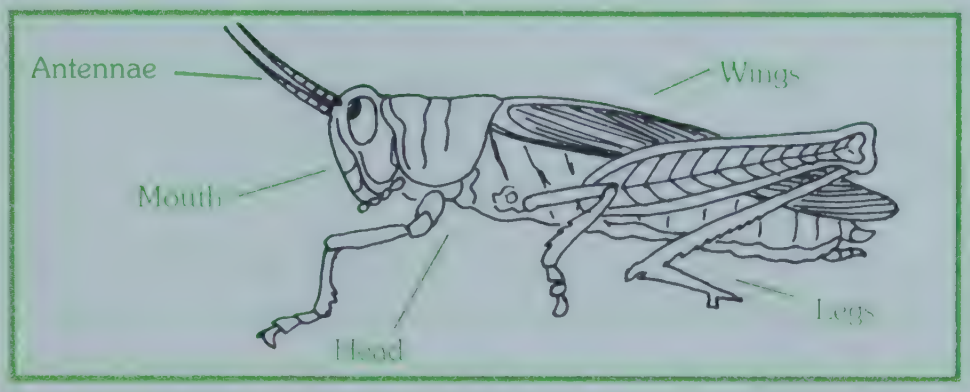
Hooded grasshopper

Grasshopper watch

Very often people don't think of grasshoppers as wildlife. But a grasshopper and other insects are wildlife too. Have you ever observed a grasshopper very closely? A grasshopper has several very interesting features.

For this activity you will need a hand lens and ofcourse a grasshopper. Be very, very careful when you are going to catch a grasshopper for this study. Put it safely into a plastic container with holes on the lid to allow for air circulation. After you have finished observing the grasshoppers, release them. You are like scientists now, who observe wildlife without harming them. Use the following points to guide you in your observation.

Activity



Colour

Overall colour.
Any other colour.
Patterns or markings on the body.
Most attractive features.
How does your grasshopper keep itself clean?

Legs

Number of legs.
Are the front and the hind legs similar or different?
Which are the jumping legs ?
Where are the legs attached to the body?

Wings

Does your grasshopper have wings?
How many wings does it have?
Where are the wings attached to the body?

Head

How many eyes can you see on your grasshopper?
How are they different from your eyes?
Why does a grasshopper have so many eyes?

Mouth

Can you see the mouth of your grasshopper?
Feed a leaf and see how your grasshopper eats it. Can you describe this?

Antennae

How many antennae does your grasshopper have?
Where are they attached to the body?
Observe the antennae under your lens. Is it made up of many parts? Can you count them?
Why does a grasshopper need the antennae?

Sound

Does your grasshopper make sounds?
Observe carefully to see if the sound is made by its mouth or by some other part of its body.

Habitat

Where does your grasshopper live ?
Do you see grasshoppers throughout the year ?
If not, can you find out the reason for this.

Now with all the information that you have collected, can you make a poster on the grasshopper for display in your class? Do not forget to write about the role of a grasshopper in an ecosystem.

Grass Count...

Activity

Have you ever thought about the different varieties of grass species that a grassland can have ? Would you like to find out ?

Lets begin...

Take a string about 10 metres in length. Tie one end of your string to a small wooden stake in the ground and stretch it in a straight line. Collect a piece of each type of grass your string touches and tape it on your Activity Sheet. Since you may not be familiar with the names of the grasses, you might want to give each grass a number. You could do this activity in groups in different areas of your grassland and then compare the different varieties of grasses. You could paste some here. Use extra sheets if necessary.

Grass 1

Grass 2

Grass 3

Grass 4

Insect Count

Activity

How many insects do you think live in your school compound? Can you guess? One of the ways to know this is to actually count insects. But counting insects can be very tiresome. There may be several thousand ants in a particular area. However scientists have devised methods of counting insects.

Make a square frame with pipes. This could be 1m by 1m in length. You could even join four sticks together as shown in the figure to make this frame. Involve your friends in this activity and make different groups. Each group could look for insects in a different area. Throw the frame on the ground. Count all the insects that fall within this frame. Record your observations on the data sheet as shown.

Do this once a month with your 'Insect Watchers Team'. At the end of each school term draw a graph and display it on your school notice board. You can either make a line graph or a bar graph. A line graph can be used to show how the population of a particular insect varies according to the month. A bar graph can tell you which is the largest group of insects that occur in your area.

Data Card

Month _ _ _ _ _ _ _ _ _ _ _ _

Insect	No
01. Butterflies	
02. Moths	
03. Ants	
04. Bugs	
05. Beetles	
06.	
07.	
08.	
09.	
10.	
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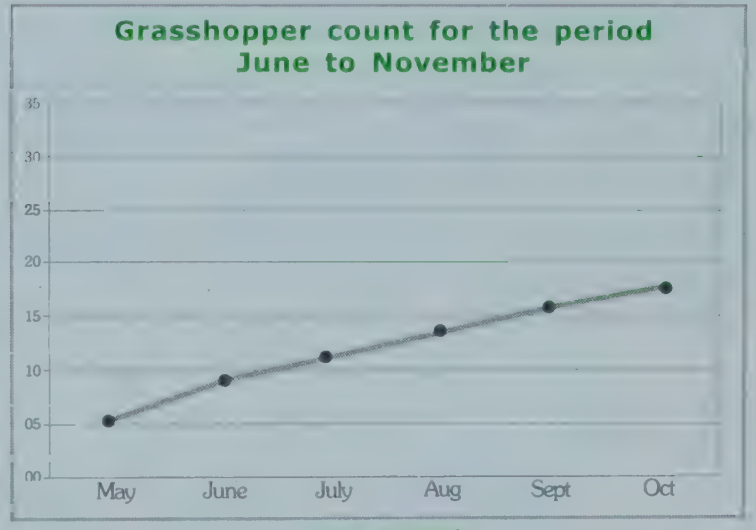
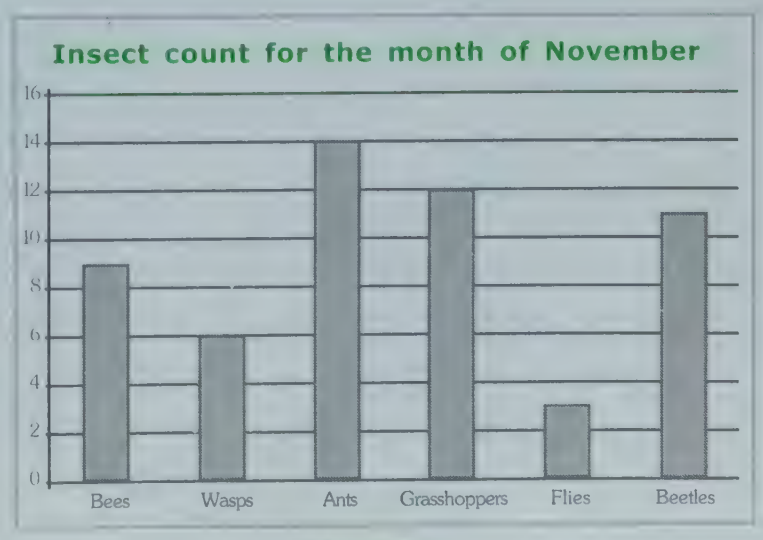


Line Graph



Bar Graph

Jumbleword

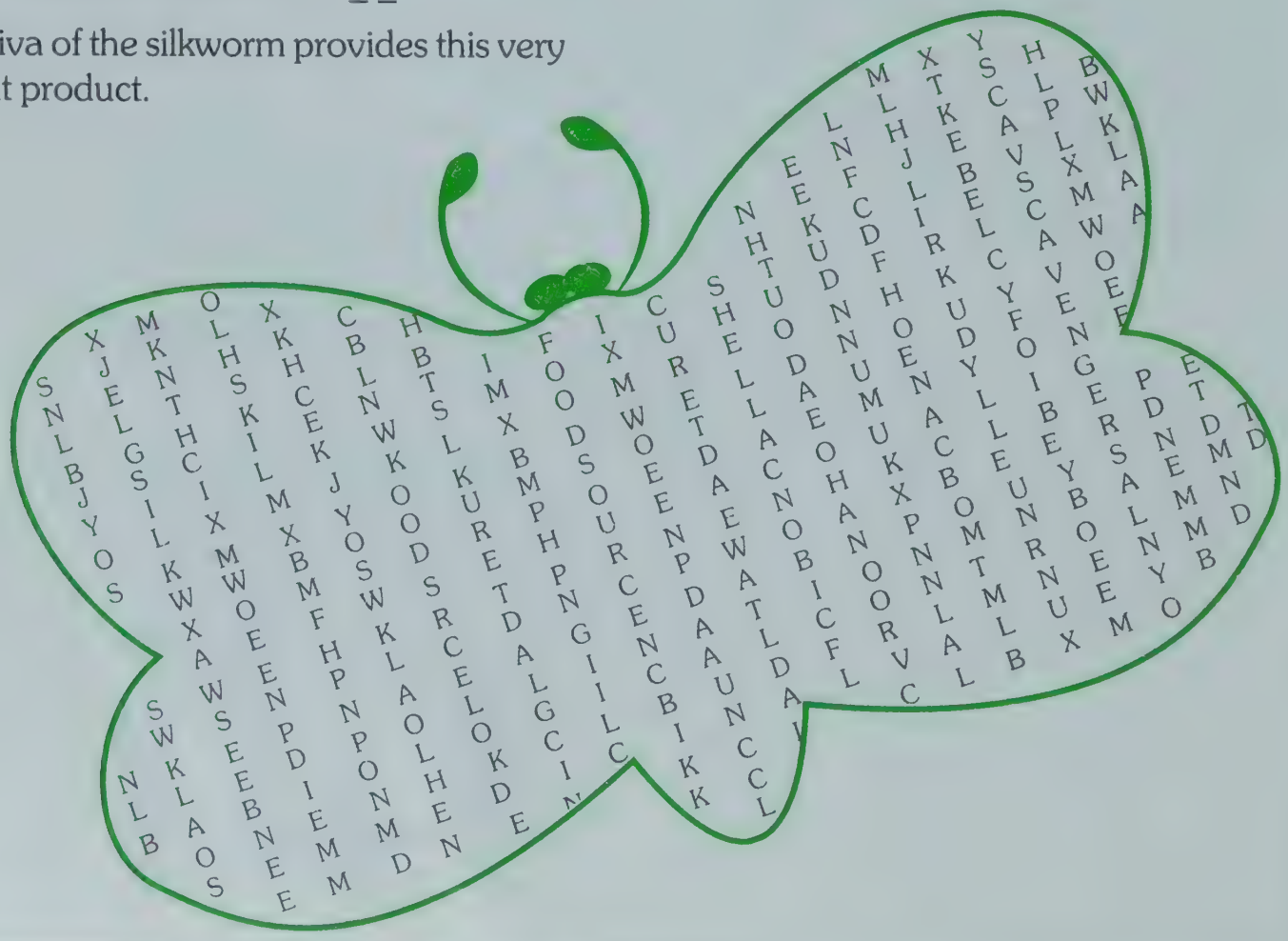
Insects inhabited the earth long before humans did. They were among the first air-breathing land animals. Insects are found all around us.

Insects do not need man for their survival. However we would face definite extinction if insects were to be removed from our ecosystem. The general impression is that insects are harmful. These however form a very small portion of the insect world. Insects not only give us several beneficial products but they also play a very important role in maintaining the balance in Nature.

Given in the jumble word below are the various vital uses of insects, not only in man's life but also in the balance of nature. Can you identify these uses ?

Activity

- Insects are responsible for the propagation of our fruit, vegetable and ornamental crops by a process called as _
- Insects provide nourishment to birds, animals and man and therefore are an important _ _
- Insects help in decomposing the dead plants and animals and are thus _
- Some insects have been used in the treatment of certain diseases. They therefore have _ _
- The ease of handling insects, their rapidity of multiplication, low cost of maintenance and rearing have made them ideal experimental animals. They are thus used in _ _
- The saliva of the silkworm provides this very important product.
- The honeybee provides man with this product.
- The wax glands of the bees produces this substance which is used in the manufacture of candles and sealing wax.
- The lac insect secretes this substance over its body to protect it from adverse weather conditions and natural enemies. This substance is used by man in the making of _
- Certain insects such as the ladybird beetle are used as natural predators to control aphids. This phenomenon is called as _

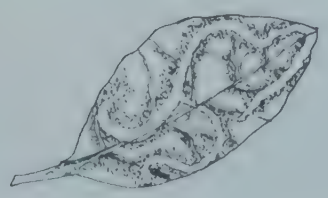


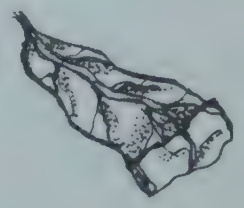
Grassland signs

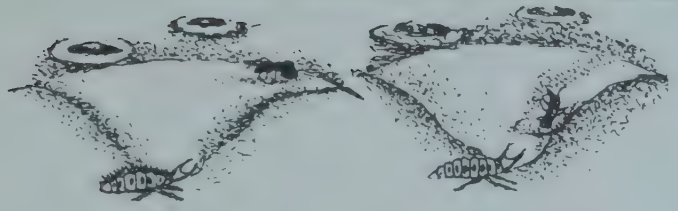
Activity

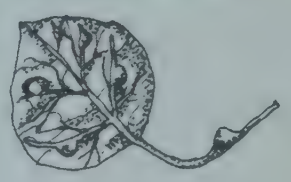
All animals leave behind them a 'life-sign'. One of the most exiting ways of finding out the presence of animals is by looking for their signs. These signs could be food remains, tracks on the ground, droppings, feathers, nests, prey traps and damage done to leaves or barks. Many insects damage crop plants by boring and tunnelling in the bark, stem or twigs. These are called 'borers'. There are others that bore holes in nuts or seeds. These are 'worms' or 'weevils'. Some insects bore between the upper and lower epidermis of the leaf leaving a white line on the surface of the leaf. These are 'leaf miners'. Some insects cause cancerous growth on plants, within which they live and feed. These are called as gall insects. Some ants carry leaves and other parts for constructing shelters or lining their nests.

Can you associate the following signs with the respective animals ? One of them has been done for you.

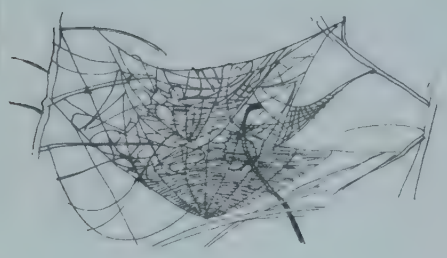


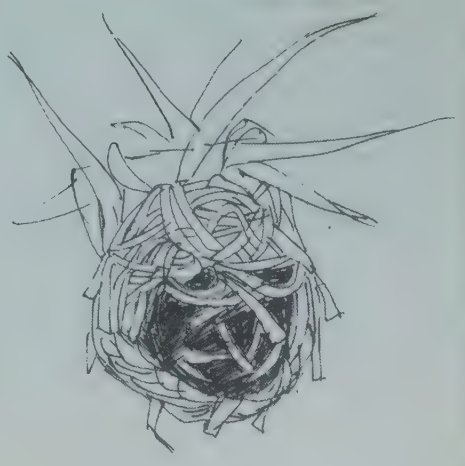






Blackbuck





Insect Hunt

One can watch insects almost anywhere and at any time during the day or night. Insect watching can be an interesting hobby. It however requires enormous patience and practice to approach an insect without disturbing it. You can use this sheet for discovering insects. Find an insect associated with each of the elements given below.

Activity

Dead animals	**Darkness**	**Predators**
Nectar	**Camouflage**	**Galls**
Mimicry	**No wings**	**Sucking mouth parts**

Wood	Bright colour	Dung
Green colour	Grass and leaves	Hopping legs
Grasping legs	Digging legs	Chewing mouth parts

Grassland birds

Kestral

Green bee eater

Little brown dove

Indian koel

Indian rollar

Bay backed shrike

Common quail

Spotted owlet

Spotted Babbler

Indian Ring dove

Indian Little nightjar

Indian Spotted dove

Grey partidge

Common hoopoe

Crested lark

Bird calls

Bird calls can be great assets in locating and identifying birds, especially when they cannot be seen easily. Birds use a variety of calls for different purposes. Young birds use begging calls when hungry. They send their parents location calls when separated from them. Each call has been evolved to suit a particular function. For instance there are two types of warning calls. When a predator is stationary, the call is loud, repetitive and of varying frequency. This serves to attract the neighboring birds to join the mob. However if the predator is in the air and is therefore an immediate threat, the bird seeks shelter and emits a call on a constant frequency.

The most attractive calls are the songs of the male birds during the breeding season. They advertise the males' territory to attract the females and keep out the rival males.

There are some birds like the Racket tailed drongo that are excellent in mimicking the calls of other birds. The drongo mimics the calls and even the complete songs of other species like the crested serpent eagle, grey junglefowl, koel, grey hornbill, black woodpecker, etc.

Activity

Can you match these calls with the birds givne on the adjacent page?

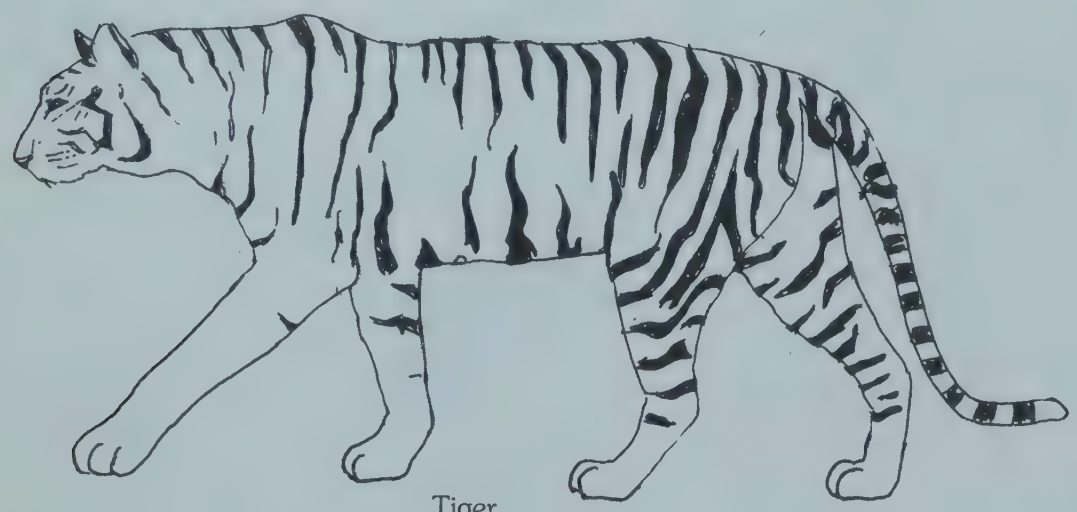
Bird Calls	Name of the Bird
• Coo-rooroo-rooroo or cru-do-do-do-do-do	
• Kateetar kateetar kateetar (alarm call - kirrr kirrr kirrr)	
• Chuck-chuck-chuck-chuckr-r-r-r	
• Cheevak, cheevak	
• he'll beat or he'll beat you, I'm right here, pret –ty-sweet	
• Kak (or chack)-kak-kak-kak	
• ti-ee or tee-urr	
• Chur-r or chee-urr	
• tree-tree-tree or teerp-teerp-teerp	
• Hoo-po or hoo-po-po (or hud-hud-hud)	
• Kukkoo-kook (repeated several time in tunes)	
• Krookruk-krukroo..... kroo-kroo-kroo	
• drr- r - r - r - r - r	
• Ki - ki - ki - ki or tit .....wee	
• Coo oo Coo oo (or Cabil Cabil Cabil Cabil)	

Grassland mammals

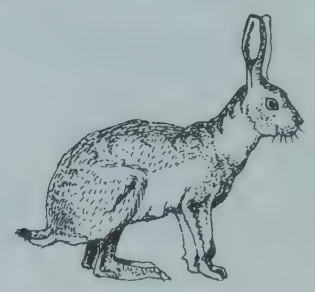
As a general rule under natural conditions animals tend to occur closer together. However sometimes animals come together to form aggregations (large groups) for specific reasons. Very often it for purposes of safety. Animals like the gaur, the wild buffalo and the elephant stay together as then they can defend themselves as well as their young ones from predators. However there are certain animals that can neither hide from nor actively fight their predators. This is seen in grassland animals like the antelopes. In such cases there is a greater chance of a single animal being preyed than animals that are in a group.

Activity

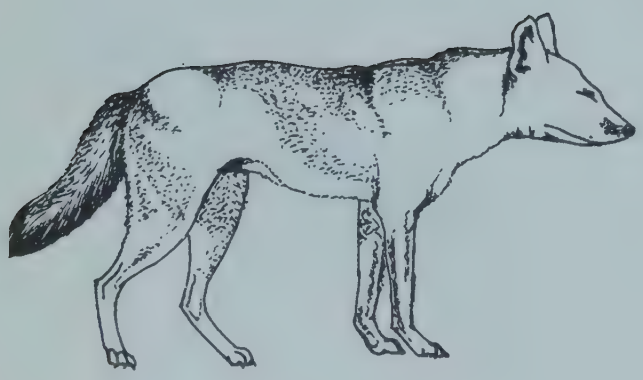
Circle mammals that don't belong to the grassland.



Tiger

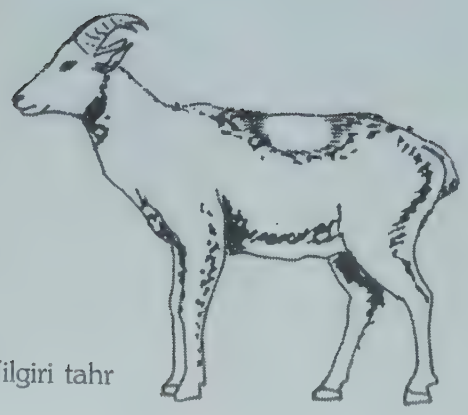


Hare

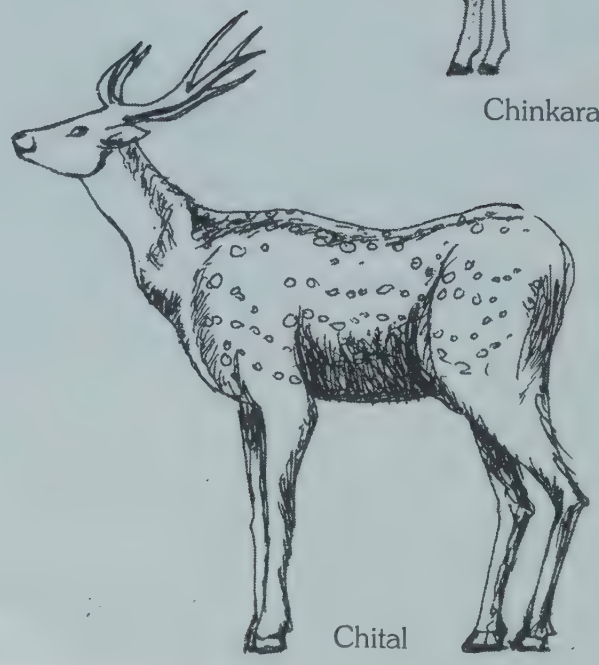


Wolf

Chinkara

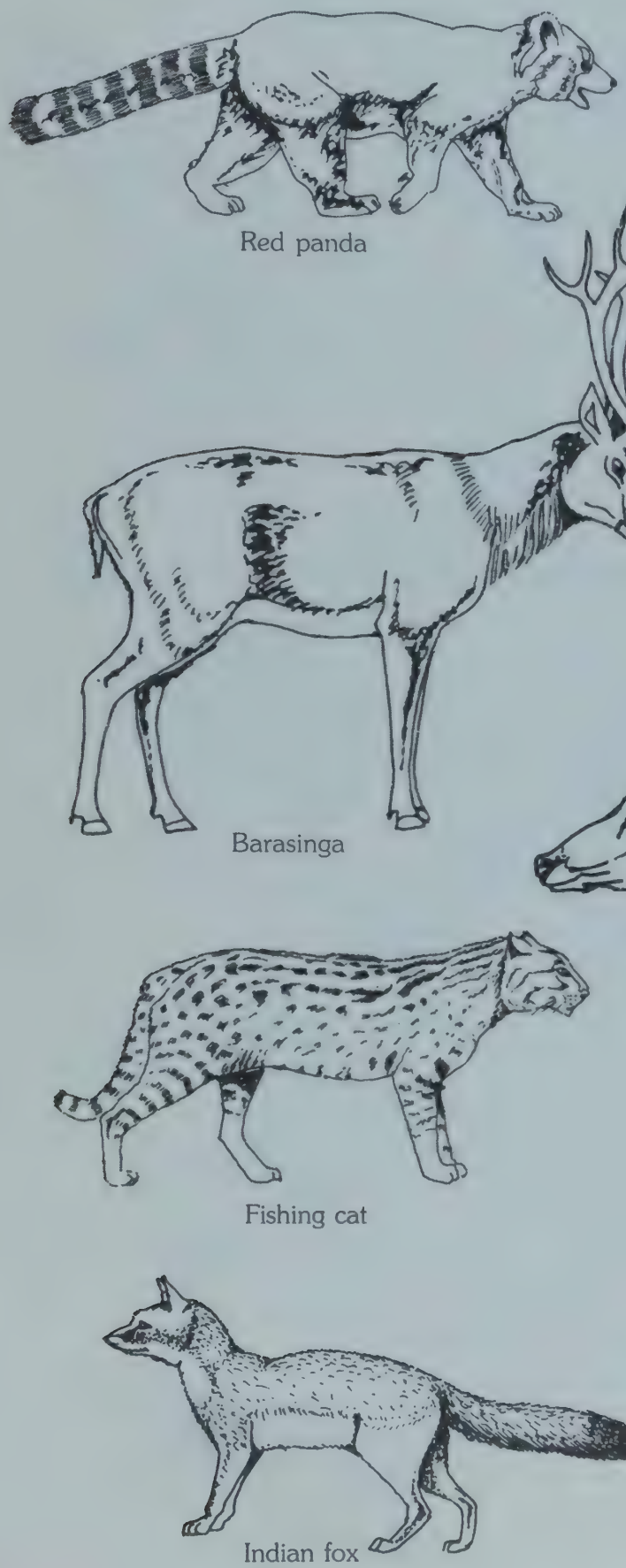


Nilgiri tahr



Chital

These animals come together as a response to danger and try to get to the center of the herd, where they have the best chance of safety. Some others like the pigeon are seen together, as ten or twenty pairs of eyes and ears are more likely to detect the presence of a predator thus enabling them to fly. Carnivores like the wild dog and the hyenas can kill prey much larger than their own size by hunting in packs. Several grassland animals are today endangered.

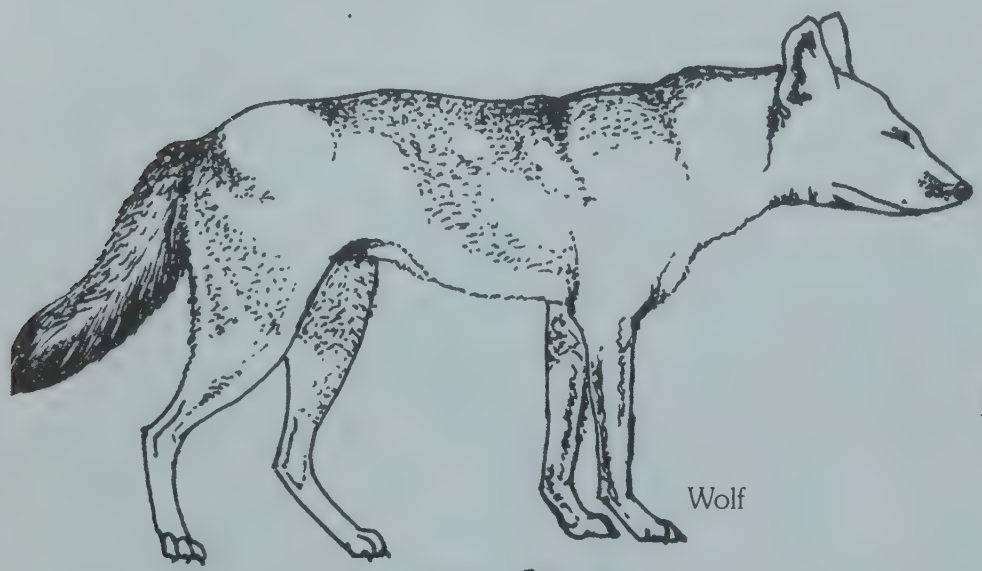


The grassland community

A grassland is a community of plants and animals. Different animal species occupy different areas in a grassland, thus allowing for greater diversity. Each of these animals and birds feed on specific plants and animals.

Activity

Using the various components given below create at least five food chains and link them to form a food web. One has been done for you.



Wolf

Black winged kite

Common hoopoe

Monitor lizard

Blackbuck

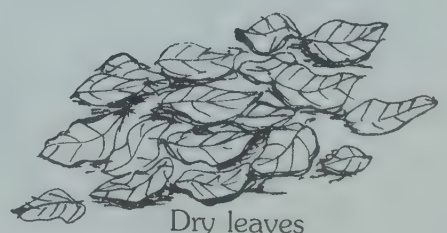
Crested lark

Dung beetle

Little brown dove

Grasshopper

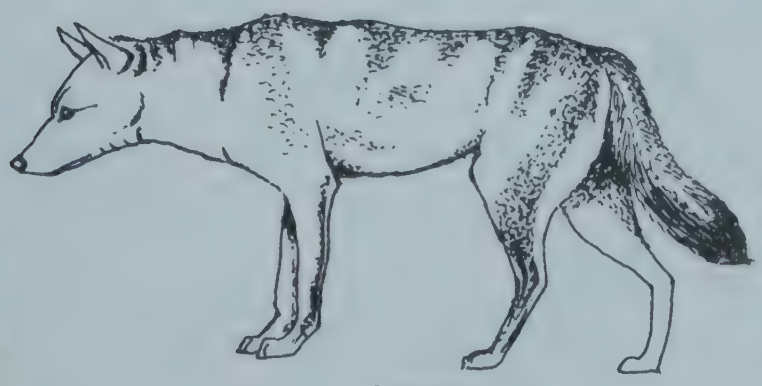
Harvester ants



Dry leaves

You may have seen spiders catching different insects. These insects use plants as their food. This is thus a simple food chain which links plants with herbivorous insects which are linked to carnivorous spiders. The insects may also be eaten by insectivorous birds. Thus several food chains may be linked to each other. This forms a food web.

Kestral



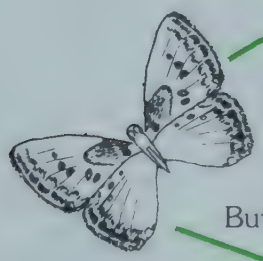
Jackal

Nightjar

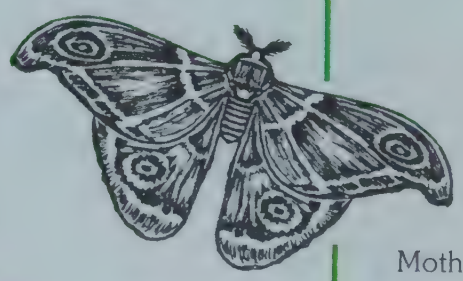
Tunnel web spider

Calotes

Grey partidge



Butterfly



Moth

Caterpillar

Dung

Flower

Termite

Grass

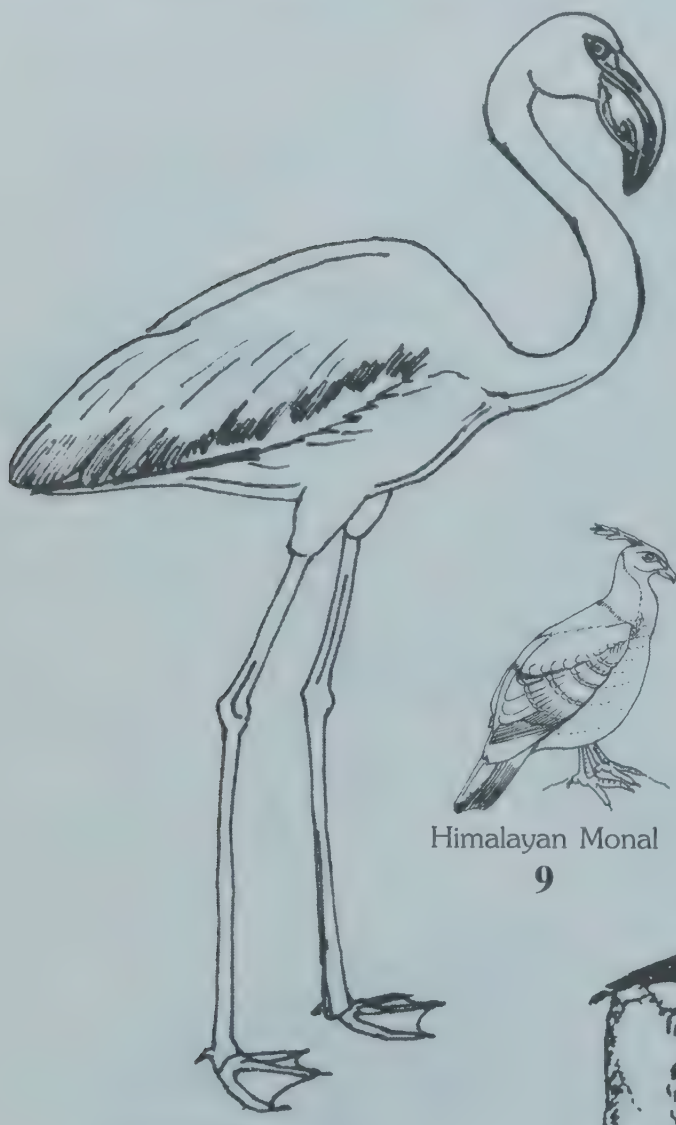
Fungi

State birds

All of us know that the tiger is our National animal and the peacock is our National Bird. Why do you think that these two animal have been selected as National symbols? What do they represent?

Activity

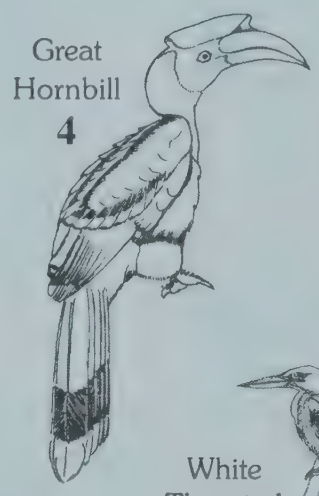
Match the birds to their respective states.



Greater Flamingo
1

Black Crested Bulbul
11

Black Francolin
20



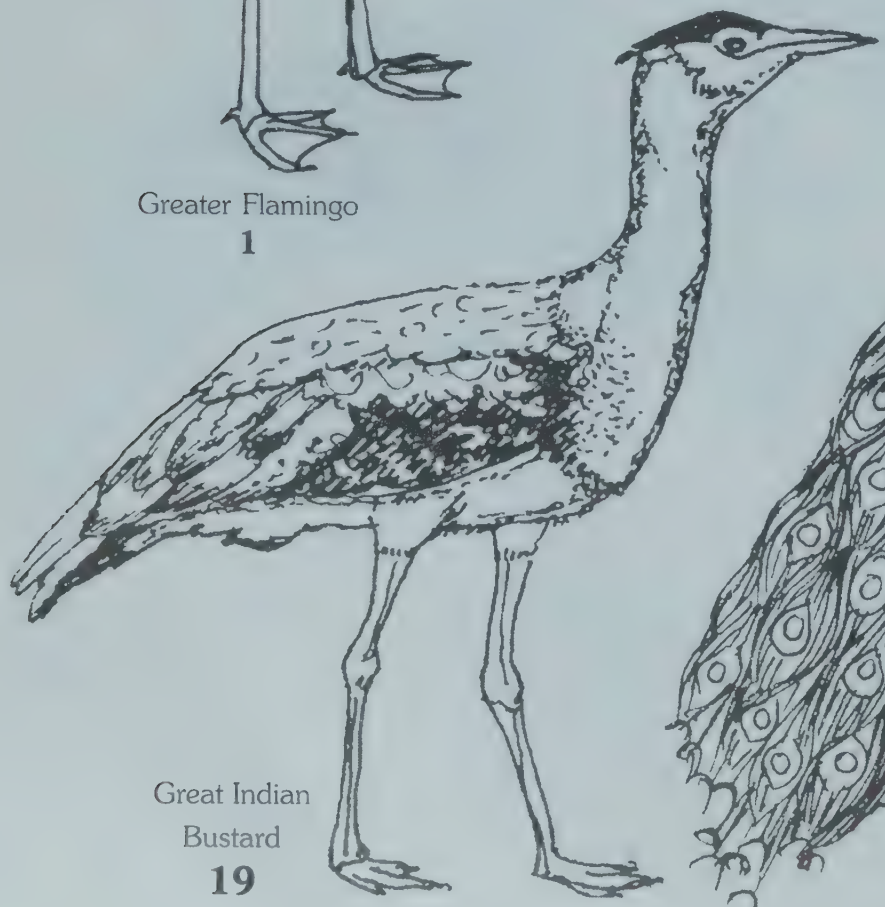
Great Hornbill
4

Himalayan Monal
9

Green Imperial Pigeon
5

White Throated Kingfisher
7

Peacock
13



Great Indian Bustard
19

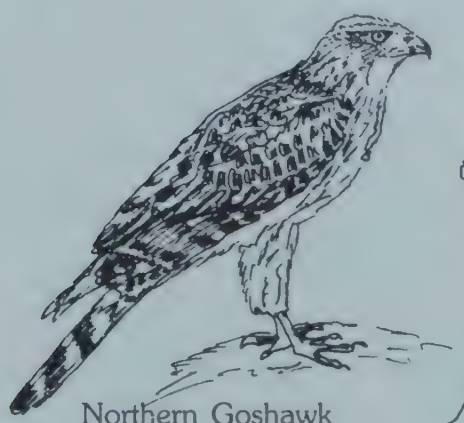
Asian Koel
14

Indian Roller
3

Do you know that each state has its own state bird and animal? Have they been selected because they are abundant in the state or because they are threatened and endangered?

Asian Paradise Flycatcher
17

Hill Myna
10



Northern Goshawk
2

Blood Pheasant
15

Black Necked crane
18

Sooty Tern

Sarus Crane
16

Emerald Dove
8

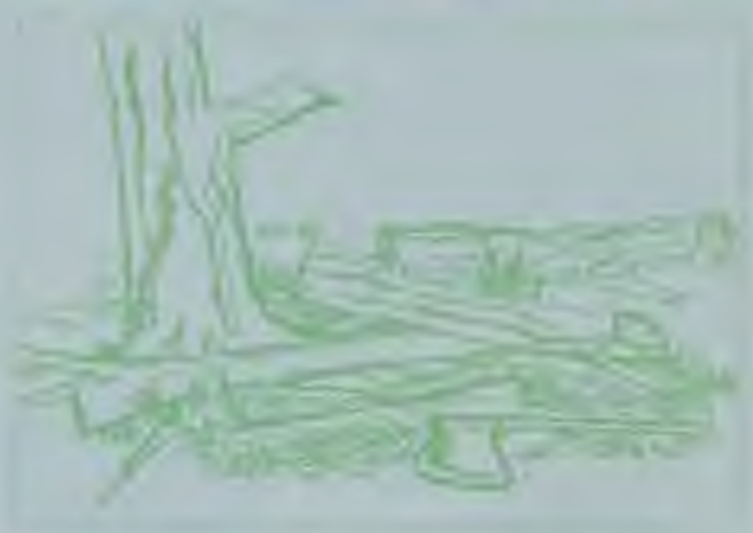
Blyth's Tragopan
6

Mrs. Hume's pheasant
12

A Grassland story

A list of words and pictures associated with grasslands are given below. Use as many of the words and pictures you can to write a story. You can even add your own pictures.
Your teacher could put the best story on your school notice board.

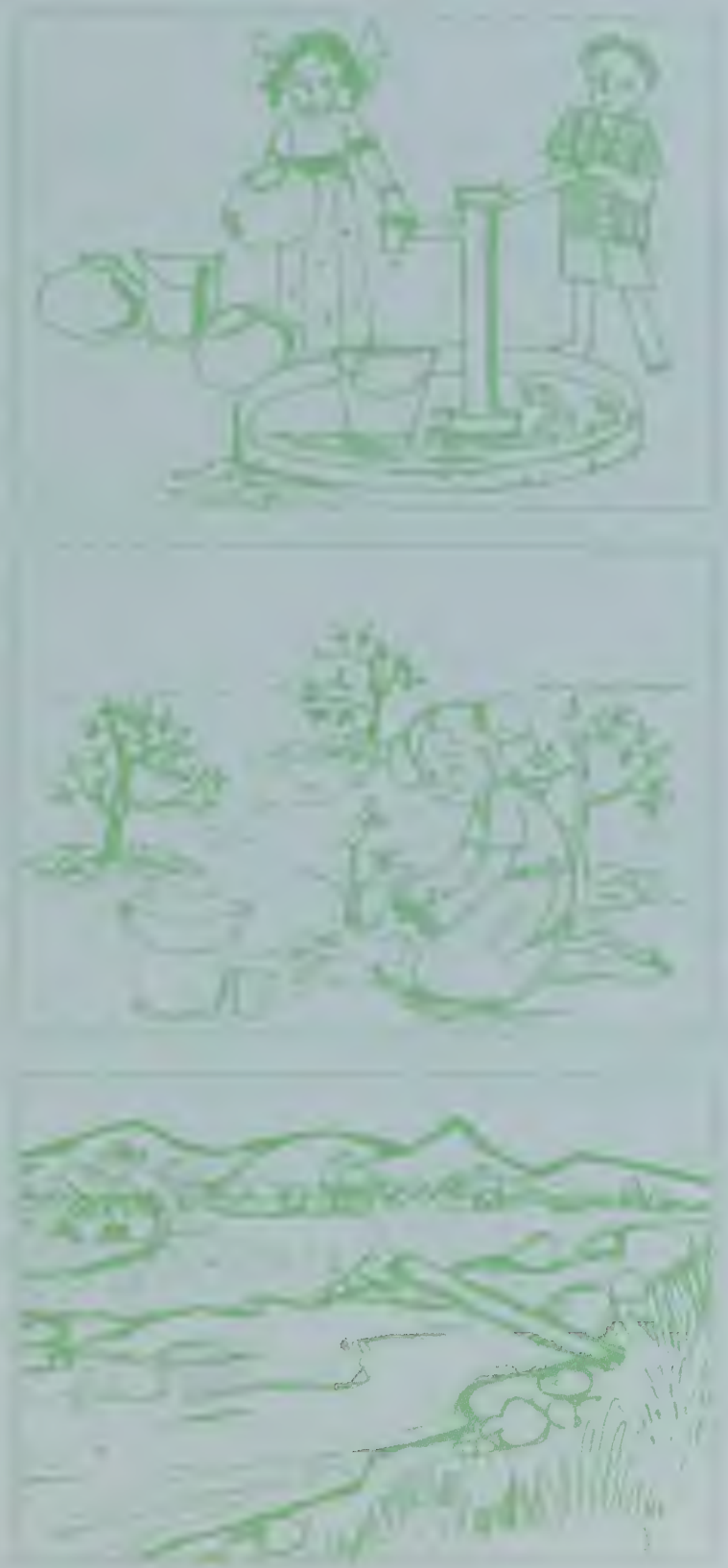
grass
farmers
boulders
weeds
grasshopper
praying mantis
sand boa
fan throated lizard
calotes
goats
babul tree
irrigation
land convertion
migration
small Indian fox
bag worm
spittle bug
pesticide
fertilizer
drought
water
bajra
prey
Sanctuary



rainfall
crested lark
dams
summer
forbs
burrow
jowar
sugarcane

canal
predator
wolf
cheetah
great Indian bustard
drinking water
cows
bore wells

clouds
development
poverty
blackbuck
extinction
poaching
adaptation



Something interesting....

Activity

Nature always has small interesting things. One only needs to be very observant and look for them. These could be interesting places, interesting animals or birds or plants or just interesting phenomenas. Can you look around for interesting objects that match the headings on your Activity Sheet ?

Something beautiful

Something old

Something unusual

Something new

Something damaged

Something you can't pick up

Something ugly

Something you have never seen before

Something irritating to touch

Some place which is your favourite

Something in the ground

Something with a pleasant smell

My discovery.....

When we know how our natural environments work, what life is in them and how man's activities are changing them, we are in a much better position to make management decisions. Keeping records therefore is an important part of the learning process. You could record anything that you want to learn about. Eg: growth of plants, seasonal variation in plants, animal behavior, how animals and plants need each other, changes is habitat and so on....

As you read the information that you have recorded, you can easily understand the changes that are occurring around you. You will be able to identify, seasonal changes (changes that take place in particular seasons). If you continue to keep records over years you will be able to identify annual changes.

Events	**January**	Major discovery

Events	**February**	Major discovery

You will also begin to understand the types of change, reasons for this change and will then be able to give suggestions for preventing damage to the environment in future. You could make a time line of your observations in the grassland. This will tell you when a particular event will occur again. Drawing graphs from your data as in 'Insect Count' will help you make concrete conclusions about species or events. This could eventually help in the conservation of special bird areas, and so on. You could discuss your findings with your teachers who could then help you write an article for the newspaper to let other people know and join in your conservation effort. Are you ready then to begin recording?

Events	**March**	Major discovery

Events	**April**	Major discovery

Events

May

Major discovery

Events

June

Major discovery

Events

July

Major discovery

Events

August

Major discovery

Events

September

Major discovery

Events

October

Major discovery

Events	November	Major discovery

Events	December	Major discovery

What can you do ?

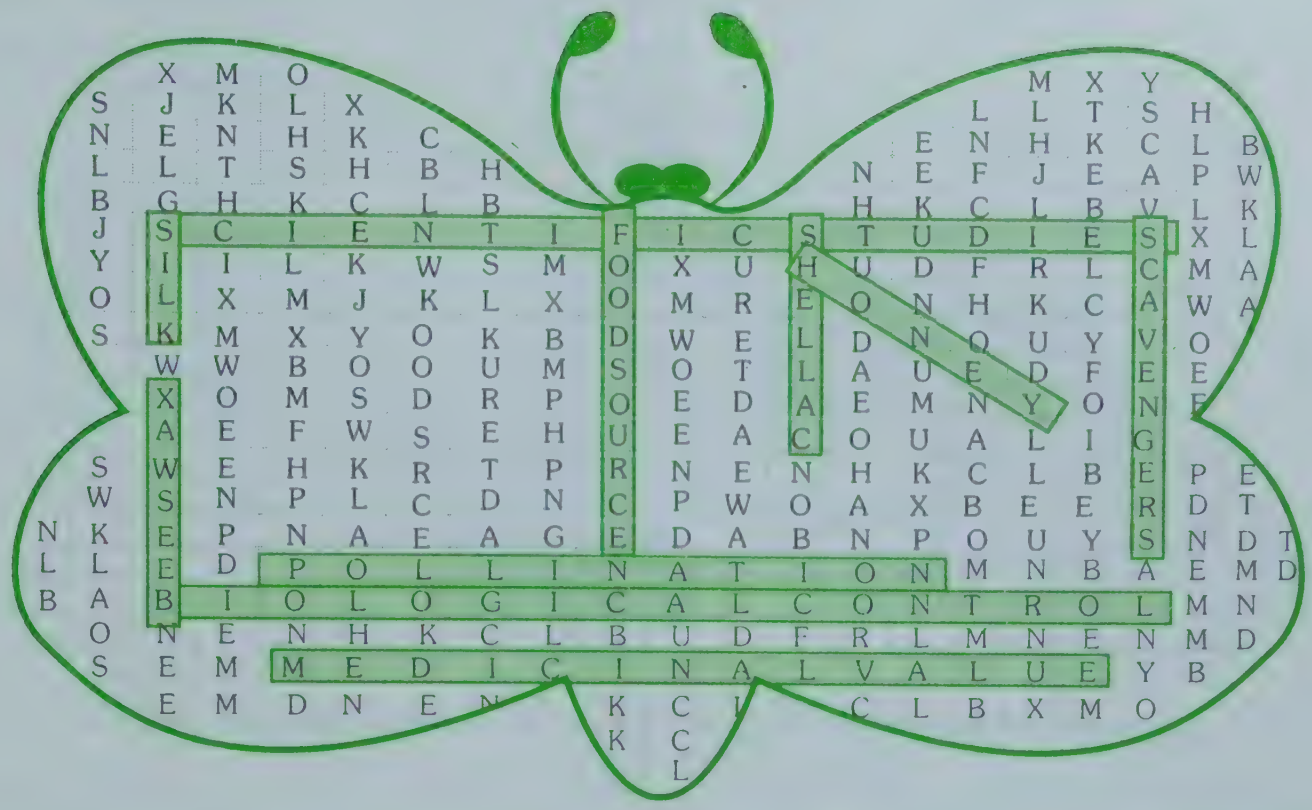
Have you enjoyed exploring your grassland? Grasslands are complex ecosystems that harbour a variety of species. Excess use of pesticides and burning of grasslands can damage this ecosystem rapidly. Every small ant, grasshopper and butterfly has its own unique role in the ecosystem. Each one of them is a part of our web of life. If they become extinct they can never be brought back....

You can observe some of the fascinating insects and birds in and around your homes too. However besides exploring Nature you need to also act for its conservation. This is what you can do...

- Write a letter to an influential person or to a newspaper expressing your concern over burning of grasslands.
- Insects play a very important role in our lives. Do not kill them unnecessarily.
- Grassland species like the wolf and the blackbuck are endangered. Initiate a signature campaign to protect these animals. You could send it to your local Forest officer.
- Will you tell other people about how wonderfully interesting Nature is? If you do, other people will also become concerned. Grasslands can then be conserved.

Answer sheet

Page No. 12



Page No. 16

Bird Name	Bird Calls
Little brown dove	Coo-rooroo-rooroo or cru-do-do-do-do-do
Grey partridge	Kateetar kateetar kateetar (alarm call - kirrr kirrr kirrr)
Indian Little nightjar	Chuck-chuck-chuck-chuckr-r-r-r
Spotted Owlet	Cheevak, cheevak
Spotted Babbler	he'll beat or he'll beat you, I'm right here, pret –ty-sweet
Indian Roller	Kak (or chack)-kak-kak-kak
Crested Lark	ti-ee or tee-urr
Baybacked Shrike	Chur-r or chee-urr
Small Green Bee-eater	tree-tree-tree or teerp-teerp-teerp
Common Hoopoe	Hoo-po or hoo-po-po (or hud-hud-hud)
Indian Ring Dove	Kukkoo-kook (repeated several time in tunes)
Indian Spotted Dove	Krookruk-krukroo…….. kroo-kroo-kroo
Comman Quail	drr- r - r - r - r - r
Kestral	Ki - ki - ki - ki or tit .....wee
Indian koel	Coo oo Coo oo (or Cabil Cabil Cabil Cabil)

Page No. 18

Animals that don't belong to the grassland:

Red panda	Tiger	Fishing cat
Musk deer	Chital	Barasinga

State name	State bird
Andhra Pradesh	Indian Roller
Arunachal Pradesh	Great Hornbill
Assam	*
Bihar	Indian Roller
Chhattisgarh	Hill Myna
Delhi	*
Goa	Black Crested Bulbul
Gujarat	Greater Flamingo
Haryana	Black Francolin
Himachal Pradesh	Himalayan Monal
Jammu & Kashmir	Black Necked crane
Jharkhand	Asian Koel
Karnataka	Indian Roller
Kerala	Great Hornbill
Madhya Pradesh	Asian Paradise Flycatcher
Maharashtra	Green Imperial Pigeon
Manipur	Mrs. Hume's pheasant

State name	State bird
Meghalaya	Hill Myna
Mizoram	Mrs. Hume's pheasant
Nagaland	Blyth's Tragopan
Orissa	Peacock
Punjab	Northern Goshawk
Rajasthan	Great Indian Bustard
Sikkim	Blood Pheasant
Tamilnadu	Emerald Dove
Tripura	Green Imperial Pigeon
Uttaranchal	Himalayan Monal
Uttar Pradesh	Sarus Crane
West Bengal	White Throated Kingfisher
Andaman & Nicobar	*
Chandigarh	*
Dadar & Nagar Haveli	*
Daman & Diu	*
Lakshdweep	Sooty Tern
Pondicherry	*

* not yet declared.

You may like to refer to the following resources for more information. While some books may be available at leading bookstores the rest could be ordered from the respective organizations.

Books

1. The Book of Indian Birds by Salim Ali published by the Bombay Natural History Society, Mumbai.

2.Birds of the Indian Sub-continent by Richard Grimmet, Carol Inskipp and Tom Inskipp published by the Oxford University Press

3.The Book of Indian Animals by S.H. Prater published by the Bombay Natural History Society, Mumbai

4.The Book of Indian Trees by K.C. Sahni published by the Bombay Natural History Society, Mumbai

5.The Book of Indian Reptiles by J.C. Daniel published by the Bombay Natural History Society, Mumbai

6.Insects by C.S. Mani produced by the National book Trust, New Delhi

7.Encyclopedia of Indian Natural History by Haukim (Ed), produced by BHNS/ OUP 1986

Audio-Cassettes

Indian Bird Calls compiled by Erach Bharucha produced by the Bombay Natural History Society, Mumbai

CD-Roms

The Biodiversity of India by Erach Bharucha produced by Mapin Publishers, Ahemdabad

Organisations

A list of National level organizations that could help you with information is provided. You could also contact the local Forest Department, the Botany and Zoology departments of local colleges and universities as well as zoos for information. Besides these there may be several other local organizations and individuals who could also help you.

- Bharati Vidyapeeth Institute of Environment Education and Research
  Bharati Vidyapeeth Deemed University
  Katraj-Dhankawadi, Pune 411 043
  Phone 020-4375684 Email: bvieer@vsnl.com

- Bombay Natural History Society
  Hornbill House, Shaheed Bhagat Singh Marg
  Fort, Mumbai 400 001
  Phone: 022 – 2821811 / 2025481
  Email: bnhs@bom4.vsnl.net.in

- Centre for Environment Education
  Thaltej tekra, Ahmedabad – 380 054
  Phone: 079-6858002 / 6858003
  Email: ceeindia@vsnl.com

- C. P. R. Environmental Education Centre
  The C.P. Ramaswami Aiyar Foundation
  1 Eldams Road, Alwarpet, Chennai – 600 018
  Phone: 044-341778 / 436526
  Email: cpreec@vsnl.com

- Paryavaran Shiksha Kendra
  Uttarakhand Seva Nidhi, Almora, Uttaranchal
  Phone: 05962-34430

- Salim Ali Centre for Ornithology and Natural History
  Anaikatty P.O. Coimbatore -641108
  Phone: 0422-857101/2//3/4 Email: salimali@vsnl.com

- Wildlife Institute of India
  Post Box No.18, Chnadrabani, Dehradun – 248001
  Phone: 0135-640111 to 640115 Email: wii@wii.gov.in

- WWF-India Secretariat
  172-B Lodi Estate, New Delhi-110003
  Phone: 011-4691760 Email: wwfindia@crosswinds.net
  (WWF has branches in various states. You could contact your nearest WWF office.)

Notes

Notes

The Bharati Vidyapeeth is an educational institution that has over a hundred teaching institutions spread over Western Maharashtra in both urban and rural areas. The Bharati Vidyapeeth Institute of Environment Education and Research (BVIEER) established on 25th January 1994 is a part of the Bharati Vidyapeeth Deemed University, Pune.

The programs of the Institute include formal environment education, non-formal educational activities and research. These independent spheres of activities have been integrated to augment the effectiveness of all three components. In the formal sector the Institute conducts a Doctoral program, a Masters program and an undergraduate program in Environment Science as well as a Diploma in Environment Education specially designed for inservice school teachers and individuals working with Government or Non-Government organizations who deal with environmental issues. The Institute has a major non-formal environment education outreach initiative which includes conducting training workshops for teachers in environment education, organizing school environment education programs through trained teachers and developing locale specific environment education material. The Institute also houses an Environment Museum and Activity Centre, which is used by teachers and students as a teaching-learning resource. The research done at the Institute focuses on need based issues with a view to bring about proconservation action. A major focus is on biodiversity conservation and environment education

The India-Canada Environment Facility (ICEF) was established in 1993 following the signing of a Memorandum of Understanding (MOU) between the Government of India and the Government of Canada in 1992.

It is a joint project of the two Governments for the purpose of undertaking environmental projects in the water and energy sectors. ICEF operates as a registered society under the Indian Societies registration Act 1860. It is jointly managed by representatives from the Governments of India and Canada. The partnership works directly with Indian institutions and organisations to enhance and promote environmentally sound development, with a principal focus on building and sustaining institutional capacity and related management capability in natural resource and environmental management. The objectives of ICEF are institutional development, conservation and restoration, policy and national dialogue and technology adoption.

The World Wide Fund for Nature-India (WWF-India) formerly known as the World Wildlife Fund-India was established in 1969 as a Charitable trust under the Bombay Public trusts Act 1950.

Today WWF-India is the country's largest conservation NGO with a network of State/ Divisional and Field Offices spread across the country with its Secretariat located in New Delhi. WWF's mission is 'The promotion of nature conservation and environmental protection as the basis for sustainable and equitable development'. In achieving its mission WWF uses field programs that serve as demonstration projects, public policy analysis and debates through independent research, consultation, campaigns, education activities for key target groups including the youth, professionals and administrators, networking and supporting the work of fellow NGOs in India and mobilizing necessary financial, scientific and technical resources.

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